

CLAIMS

I claim:

- 1)** A Rankine cycle electrical generating plant having a significant vertical separation of the turbine condenser above the vapor generator to enable gravity to provide all or a significant part of the working fluid pressure required to supply condensed liquid working fluid to the vapor generator system.
- 2)** A Rankine cycle electrical generating plant as in claim 1 where the said vertical separation is provided in whole or in part by surface terrain, either natural or artificial.
- 3)** A Rankine cycle electrical generating plant as in claim 1 where the said vertical separation is provided in whole or in part by an underground excavation or a natural cavern.
- 4)** A Rankine cycle electrical generating plant as in claim 1 where the said vertical separation is provided in whole or in part by a structure rising above local surface elevation.
- 5)** A passive primary or secondary emergency cooling system for a nuclear reactor as in claim 2 which exploits the said vertical separation of claim 2 to allow gravity to pressurize a heat exchanger system within or in thermally conductive contact with a reactor containment vessel from a large reservoir of emergency coolant;

said reservoir located at a significant elevation above the reactor / steam generator installation and having the coolant return as either liquid or vapour by a sealed pipe system to an emergency condenser and capture system installed near the coolant reservoir level.

- 6) A passive primary or secondary emergency cooling system for a nuclear reactor as in claim 3 which exploits the said vertical separation of claim 3 to allow gravity to pressurize a heat exchanger system within or in thermally conductive contact with a reactor containment vessel from a large reservoir of emergency coolant;
- said reservoir located at a significant elevation above the reactor / steam generator installation and having the coolant return as either liquid or vapour by a sealed pipe system to an emergency condenser and capture system installed near the coolant reservoir level.
- 7) A containment of a nuclear reactor having the containment functionality enhanced by being installed in a sealable excavation deep underground below the condenser system, with said containment excavation being designed to exploit the mass of the large vertical column of rock and earth above it to increase its capacity for containing pressure and therefore contaminants in the event of an emergency and to resist breaching for any reason of the containment.
- 8) A passive emergency cooling system for a nuclear reactor as in claim 2 or claim 3 which employs the said vertical separation of claim 2 or claim 3 to allow gravity to pressurize an isolated passive emergency high pressure cooling heat exchanger system installed near the level of the reactor and thermally connected to the reactor primary circuit, from a sufficient reservoir of emergency cooling water located at a significant elevation above the reactor installation and having the coolant return as vapour by a sealed pipe system to an emergency condenser and capture system installed at the coolant reservoir level.

9)A passive emergency cooling system for a CANDU heavy water nuclear reactor as in claim 2 or claim 3
which employs the said vertical separation of claim 2 or claim 3 to allow gravity to pressurize an isolated passive emergency high pressure cooling heat exchanger system installed near the level of the reactor and thermally connected to the reactor moderator fluid, from a sufficient reservoir of emergency cooling water located at a significant elevation above the reactor installation and having the coolant return as vapour by a sealed pipe system to an emergency condenser and capture system installed at the coolant reservoir level.